

Claims

- [c1] 1. A bump process for fabricating a plurality of bumps and an underfill layer on the active surface of a chip in a flip chip package, wherein the chip has a plurality of die pads on the active surface of the chip, the bump process at least comprising the steps of:
- (a) forming an adhesive layer over each of the die pads;
 - (b) scattering a plurality of bump balls on the active surface of the chip;
 - (c) vibrating the bump balls such that one of the bump balls is attached to the adhesive layer on each die pad;
 - (d) removing the un-attached bump balls;
 - (e) applying an underfill material on the active surface of the chip to encapsulate the bump balls; and
 - (f) removing a portion of the underfill material to expose a top surface of each the bump ball.
- [c2] 2. The bump process of claim 1, wherein the step (c) is performed by using an ultrasonic vibrator.
- [c3] 3. The bump process of claim 1, wherein the bump ball is comprised of a solder material.
- [c4] 4. The bump process of claim 3, wherein after the step

(d) further comprises a step (d1) of performing a reflow process to soften the bump balls.

- [c5] 5. The bump process of claim 3, wherein the adhesive layer comprises a flux material.
- [c6] 6. The bump process of claim 4, wherein after the step (d1) further comprises a step (d2) of applying a coining process to planarize the top surface of each bump ball.
- [c7] 7. The bump process of claim 1, wherein the adhesive layer is comprised of a solder material and the bump ball has a melting point higher than the adhesive layer.
- [c8] 8. The bump process of claim 7, wherein the step (c) further comprises performing a reflow process to melt the adhesive layer such that one of the bump balls adheres to the adhesive layer on each die pad.
- [c9] 9. The bump process of claim 1, wherein the step (d) is performed by a vacuum suction operation.
- [c10] 10. The bump process of claim 1, wherein the step (e) is performed by a coating process.
- [c11] 11. The bump process of claim 1, wherein the step (f) further comprises removing a portion of each the bump ball at the top surface.

- [c12] 12. The bump process of claim 1, wherein the step (f) is performed by a polishing operation.
- [c13] 13. The bump process of claim 1, wherein after the step (f) further comprises forming a surface finish layer on the exposed surface of the bump ball.
- [c14] 14. A bump process on a chip for a flip chip package, wherein the chip has a plurality of die pads on an active surface of the chip, the bump process at least comprising the steps of:
- (a) applying an sticky film over each of the die pads;
 - (b) scattering a plurality of solder balls on the active surface of the chip;
 - (c) vibrating the solder balls such that only one of the solder balls is attached to the sticky film on each die pad;
 - (d) removing the un-attached solder balls; and
 - (e) performing a reflow process to bond the solder balls firmly to the die pads respectively.
- [c15] 15. The bump process of claim 14, further comprising the steps of:
- (f) applying an underfill material on the active surface of the chip to encapsulate the solder balls; and
 - (g) removing a portion of the underfill material to expose a top surface of each the solder ball.

- [c16] 16. The bump process of claim 14, wherein the step (c) is performed by using an ultrasonic vibrator.
- [c17] 17. The bump process of claim 14, wherein the sticky film comprises a flux material.
- [c18] 18. The bump process of claim 14, wherein after the step (e) further comprises a step (e1) of applying a coin-ing process to planarize a top surface of each the solder ball.
- [c19] 19. The bump process of claim 14, wherein the step (d) is performed by a vacuum suction operation.
- [c20] 20. The bump process of claim 15, wherein the step (f) is performed by a coating process.
- [c21] 21. The bump process of claim 15, wherein the step (g) further comprises removing a portion of each the solder ball at the top surface.
- [c22] 22. The bump process of claim 15, wherein the step (g) is performed by a polishing operation.
- [c23] 23. The bump process of claim 15, wherein after the step (g) further comprises forming a surface finish layer on the top surface of each the solder ball.
- [c24] 24. A bump process on a chip for a flip chip package,

wherein the chip has a plurality of die pads on an active surface of the chip, the bump process at least comprising the steps of:

- (a) forming a solder layer over each of the die pads;
- (b) scattering a plurality of metal balls on the active surface of the chip, wherein the metal ball has a melting point higher than the solder layer;
- (c) applying a reflow process and vibrating the metal balls such that only one of the metal balls is attached to the solder layer on each die pad; and
- (d) removing the un-attached metal balls.

[c25] 25. The bump process of claim 24, further comprising the steps of:

- (e) applying an underfill material on the active surface of the chip to encapsulate the metal balls; and
- (f) removing a portion of the underfill material to expose a top surface of each metal ball.

[c26] 26. The bump process of claim 24, wherein the step (c) is performed by using an ultrasonic vibrator.

[c27] 27. The bump process of claim 24, wherein the step (d) is performed by a vacuum suction operation.

[c28] 28. The bump process of claim 25, wherein the step (e) is performed by a coating process.

- [c29] 29. The bump process of claim 25, wherein the step (f) further comprises removing a portion of each the metal ball at its top surface.
- [c30] 30. The bump process of claim 25, wherein the step (f) is performed by a polishing operation.
- [c31] 31. The bump process of claim 25, wherein after the step (f) further comprises forming a surface finish layer on the top surface of eachthe metal ball.